



**PCT** 10 DEC 2004  
**INTERNATIONAL PRELIMINARY EXAMINATION REPORT**  
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P20020362WO	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP 03/05069	International filing date (day/month/year) 13.05.2003	Priority date (day/month/year) 11.06.2002
International Patent Classification (IPC) or both national classification and IPC H02K5/00		
Applicant SONY ERICSSON MOBILE COMMUNICATIONS AB et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.
- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
- These annexes consist of a total of 5 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand  05.12.2003	Date of completion of this report  07.07.2004
Name and mailing address of the International preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Torlai, P  Telephone No. +49 89 2399-2293  

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/EP 03/05069**

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

4-9 as originally filed  
1-3 filed with telefax on 05.05.2004

**Claims, Numbers**

1-8 filed with telefax on 05.05.2004

**Drawings, Sheets**

1/1 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).  
☐ the language of publication of the international application (under Rule 48.3(b)).  
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority in written form.  
☐ furnished subsequently to this Authority in computer readable form.  
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

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5. ☒ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

**see separate sheet**

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	1-8
	No: Claims	
Inventive step (IS)	Yes: Claims	1-8
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-8
	No: Claims	

2. Citations and explanations

**see separate sheet**

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EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/EP03/05069

**Re Item I**

**Basis of the report**

The amendments filed with the Fax dated 05.05.04 introduce subject-matter which extends beyond the content of the application as filed, contrary to Article 34(2)(b) PCT. The amendments concerned are the following: Page 3, paragraph 2, in particular lines 9-11.

For this additional information concerning the advantages of the subject-matter of the invention there is no basis in the application as filed.

These advantages have been correctly described in the letter of reply and are considered by the examiner in analysing inventive step.

However the information concerning these advantages should not have been incorporated into the application (Article 34(2)(b) PCT) as the applicant did.

This report has been established as if the amendments that are not in accordance with Article 34(2)(b) PCT had not been made.

**Re Item V**

**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Reference is made to the following documents:

- D1: US-B1-6 177 881 (CASTANEDA JULIO C ET AL) 23 January 2001 (2001-01-23)  
D2: US 2002/027009 A1 (SATO NORIYOSHI ET AL) 7 March 2002 (2002-03-07)

**Novelty:**

D1 is considered to represent the nearest state of the art. It discloses an electronic device with the features of the preamble of Claim 1.

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In the device known from D1 the vibrator is mounted on the side of the shell facing the front cover. This implies that the vibrator cannot be electrically connected (e.g. soldered) to the PCB in a single assembling operation together with the other electrical or electronic components of the device.

The device described in the new Claim 1 differs from said device known from D1 in the characterising features (derived from the original dependent claim 3).

For this reason subject-matter of Claim 1 is novel in respect of prior art as defined in the regulations (Rule 64(1)-(3) PCT).

**Inventive step**

The problem to be solved can be regarded as to improve the device known from D1 in order to permit a more efficient assembling of the device.

The characterising features saying that the vibrator (9) is mounted on a side of the shell element (5) that faces the PCB (4); and that an access opening (14) is provided in the shell element (5) are neither disclosed in D1 nor in the remaining documents of the available prior art.

Said documents even if combined together (supposed a skilled man would do it) would not lead to the solution proposed in claim 1.

For these reasons the solution is not considered to be obvious.

The solution described in Claim 1 offers the further advantage that when the exchangeable cover is removed the vibrator is protected by the shell element reducing the risk of being accidentally damaged.

**Dependent claims:**

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The Claims 2-8 being dependent claims of claim 1 that meets the requirements of the PCT with respect to novelty and inventive step are also considered to be in conformity with the PCT.

**Industrial application**

The claimed invention is considered as susceptible of industrial application.

Title

An electronic device with a vibrator and an exchangeable cover

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Technical field

The invention relates to an electronic device comprising

- a frame part;
- 10 - a PCB (printed circuit board) provided with electronic components, which PCB is connected to the frame part;
- a vibrator electrically connected to the PCB, which vibrator is fixed in relation to the frame part by means of an elastic fitting;
- an exchangeable outer cover releaseably connected to the frame part,
- 15 which exchangeable outer cover abuts on the elastic fitting when the exchangeable outer cover is mounted on the electronic device; and
- a protective shell element connected to the frame part, which protective shell element is positioned between the PCB and the exchangeable outer cover; the vibrator being mounted on the
- 20 protective shell element.

Related prior art

- 25 Many electronic devices, such as mobile telephones, pagers, PDAs, etc., are provided with a vibrator that silently alerts a user when a message or an incoming call is received. The vibrator usually comprises a small electromotor provided with an unbalanced mass at a rotating shaft, and it is usually mounted in the electronic device by means of an elastic fitting, such
- 30 as a rubber grommet or a flexible metal holder.

In electronic devices provided with fixed covers, such as a front cover and a back cover, the vibrator is conventionally mounted in a recess provided at the inner surface of one of the covers. However, in the electronic devices to

35 which the invention relates, i.e. electronic devices provided with at least one exchangeable cover, the vibrator is positioned away from the exchangeable

cover in order to ensure that the user does not accidentally destroy the vibrator or loosen it from its contact with the PCB. In these electronic devices the vibrator may be mounted in a recess of a not-exchangeable cover or in a holder that is connected to the PCB. Electronic devices with a vibrator mounted in this manner is known from e.g. US-A1-2002/0027009 and US-B1-6 177 881.

However, in cases where the vibrator is located away from the exchangeable cover the vibration that is produced when the unbalanced mass rotates must travel through a number of elements, such as the PCB and internal frame parts, before it reaches the exchangeable cover. The passage through these various elements dampens the vibration before it reaches the exchangeable cover, whereby the vibration that is experienced at the exchangeable cover is substantially weaker than the vibration at the location of the vibrator.

### Object of the invention

Electronic devices such as mobile telephones and components are therefore to an increasing extent made smaller and smaller. However, if the vibration waves must travel through a number of elements before they reach the cover, a relatively large vibrator must be employed in order to ensure that the experienced vibration has a certain magnitude. A smaller vibrator can be employed if it is mounted directly in a recess provided in the exchangeable cover, which, however, is undesirable since it would entail that the vibrator must be dismantled from the cover and re-mounted in the new cover. If such operation is necessary there is a great risk that the vibrator is lost or re-mounted wrongly which may cause the vibrator or other electronic components to be destroyed when the new cover is mounted.

It is therefore an object of the invention to provide an electronic device as mentioned in the opening paragraph in which it is possible to use a small vibrator that cannot be accidentally destroyed or loosened from the PCB and that is in relatively close contact with the exchangeable cover.



### Summary of the invention

- The object of the invention is achieved by arranging the electronic device mentioned in the opening paragraph in such manner that the vibrator is
- 5 mounted on a side of the shell element that faces towards the PCB, and an access opening is provided in the shell element through which the exchangeable outer cover abuts on the elastic fitting.
- Thereby the vibrator is held as well as protected by the shell element and the risk of accidentally destroying or loosening the vibrator when the cover is
- 10 removed is minimized. Furthermore, the vibrator can be securely mounted in the main body of the electronic device while the vibration waves generated by the vibrator may still be transferred directly to the exchangeable cover via the elastic fitting provided on the vibrator. Another advantage that is
- 15 achieved by arranging the exchangeable cover in abutment on the elastic fitting is elimination of the known problem of a rattling cover where the high requirements to production tolerances of the coupling means of the exchangeable cover and of the electronic device are not met. In the electronic device according to the invention the exchangeable cover abuts
- 20 on the elastic fitting, and due to the inherent elasticity of the elastic fitting it is ensured that the exchangeable cover is always in elastic abutment on the elastic fitting thereby eliminating any tolerance slip. No rattling of the cover will therefore occur.
- In a first embodiment of the invention the elastic fitting is provided with a protruding fitting part that protrudes through the access opening, and in a
- 25 second embodiment of the invention the exchangeable outer cover is provided with a protruding cover part that protrudes through the access opening. The function of either of these embodiments is to ensure that the exchangeable cover abuts on the elastic fitting.
- 30

**Claims** (amended)

1. An electronic device (1) comprising:

- a frame part (3);
- 5    – a PCB (printed circuit board) (4) provided with electronic components, said PCB (4) being connected to said frame part (3);
- a vibrator (9) electrically connected to said PCB (4), said vibrator (9) being fixed in relation to said frame part (3) by means of an elastic fitting (11;111;211);
- 10   – an exchangeable outer cover (2;102;202) releaseably connected to said frame part (3), said exchangeable outer cover (2;102;202) abutting on said elastic fitting (11;111;211) when said exchangeable outer cover (2;102;202) is mounted on said electronic device (1); and
- a protective shell element (5) connected to the frame part (3), said protective shell element (5) being positioned between said PCB (4)
- 15   and said exchangeable outer cover (2;102;202), the vibrator (9) being mounted on said protective shell element (5)

characterised in that the vibrator (9) is mounted on a side of the shell element (5) that faces the PCB (4); and that an access opening (14) is provided in the shell element (5) through which the exchangeable outer cover (2;102;202) abuts on the elastic fitting (11;111;211).

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2. An electronic device according to claim 1, characterised in that the elastic fitting (11;211) is provided with a protruding fitting part (16) that protrudes through the access opening (14).

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3. An electronic device according to claim 1, characterised in that the exchangeable outer cover (102) is provided with a protruding cover part (116) that protrudes through the access opening (14).

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4. An electronic device according to any one of claims 1-3, characterised in that the vibrator (9) comprises a housing (12); and that the elastic fitting (11;111;211) surrounds at least a major part of the housing (12).

35   5. An electronic device according to any one of claims 1-4, characterised in that the elastic fitting comprises a rubber grommet (11;111).

6. An electronic device according to any one of claims 1-4, **characterised in** that the elastic fitting comprises a flexible metal holder (211).

5 7. An electronic device according to any one of claims 1-6, **characterised in** that the electronic device (1) is a mobile radio station, such as a mobile telephone.

10 8. An electronic device according to claim 7, **characterised in** that the exchangeable outer cover (2;102;202) is a front cover; and that the frame part (3) is a back cover.